

*CAPULUS LISSUS*, SMITH, AS TYPE OF A PROPOSED NEW  
SUBGENUS (*MALLUVIUM*) OF *AMALTHEA*, SCHUMACHER.

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IN 1894 Mr. Edgar Smith described<sup>1</sup> an abyssal mollusc, from the Bay of Bengal, dredged during the cruise of H.M. Indian Marine Survey steamer "Investigator," Commander C. F. Oldham, R.N., at a depth of 90-102 fathoms. To this he gave the name of *Capulus lissus*.

Since that date Mr. F. W. Townsend has procured, from various stations in the Persian Gulf and Gulf of Oman, to be enumerated subsequently, more voluminous material, including live examples *in situ*, and exhibiting considerable variety. I know, therefore, that the author will allow me to further extend his original description to suit the larger specimens now before me, and also to propound reasons for considering this species as rather appertaining to *Amalthea*, Schum. (= *Hipponyx*, Defrance).

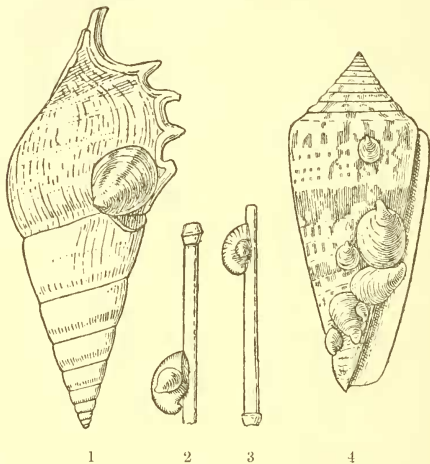
Mr. Smith rightly lays stress upon the complete absence of radiating sculpture. In all the species of either genus (*Amalthea* or *Capulus*) known to me, this sculpture is present, and accordingly, to whichever of these this mollusc belongs, that fact in either case attains equal predominance.

Mr. Townsend dredged *C. lissus* either dead, in shell-sand, mostly small imperfect examples, at a considerable depth, or alive, on *Rostellaria delicatula*, Nevill (Fig. 1), and especially *Conus planiliratus*, Sowb. (Fig. 4). On this latter it was gregarious, forming colonies of life; and usually a small example is found to have attached itself to the dorsal surface of, very probably, its parent. But the most interesting discovery was that of a few examples obtained at 122 fathoms in the Gulf of Oman in 1903, when the larger ones were found adhering to the spines of a *Cidaris* (Figs. 2, 3), invariably attended by a small, but normally shaped, offspring, attached dorsally, while they themselves had assumed a narrow oblong form, having become adapted to the attenuate spine they had affected. Contracted as they thus were, it was nevertheless necessary, as they still overlapped considerably at the base, to deposit shelly matter, formed out on both sides, thus creating a basal plate, of considerable solidity and thickness. This is a characteristic of the genus *Amalthea*, Schum., rather than of *Capulus*, Montfort, as the foot of the latter genus does not ever secrete a shelly base.

<sup>1</sup> Ann. & Mag. Nat. Hist., vol. xiv (1894), p. 166.

It at once occurred to me that I had recently somewhere noticed figures much resembling these, and a brief search soon revealed the fact that during the "Blake" Expedition a very near ally of *C. lissus* was obtained, which was described by Dr. Dall under the name of *Amalthea benthophila*,<sup>1</sup> and towards the close of this paper I propose to touch upon this species also in fuller detail.

There can be but little moral doubt but that this Western species is a New World exponent of the Oriental *C. lissus*, and is congeneric with it; and I am inclined to go even further than this, and to propose that



the unusual smoothness of surface and want of radiating sculpture are worthy of subgeneric distinction, as follows:—

#### AMALTHEA, Schum.

*Amalthea*, Schumacher, Essai, pp. 56, 181, pl. xxi, fig. 4 (1817).

*Hipponyx*, DeFrance, Bulletin Soc. Philom., p. 9 (1819).

#### MALLUVIUM,<sup>2</sup> nov. subgen.

Ab *Amalthea* typica differt superficie omnino lævigata, interdum alba, interdum longitudinaliter bi- vel tri-radiato colorata, radiis cinnamomeis vel castaneis, apertura ovata vel circulari, intus albida, margine tenui, lamina basali tenui, vel, interdum, solida.

Type: *Capulus lissus*, E. A. Smith.

<sup>1</sup> Bull. Mus. Comp. Zool. Harvard Coll., xviii, No. 29; pt. 2, p. 289, pl. xiv, figs. 1a-b.

<sup>2</sup> *Malluvium*, a basin.

1. *AMALTHEA LISSA* (E. A. Smith).

*Capulus lissus*, E. A. Smith, Ann. & Mag. Nat. Hist., vol. xiv (1894), p. 166, pl. iv, figs. 4-6.

The following is the author's original description:—

“Testa pileiformis, apice postice valde recurvato, sordide alba vel dilutissime rufescens, lineis incrementi striata, *haud radiatim sculpta*, anfractus 3, apicales duo (nucleus) globosi, læves; apex pone sed supra marginem aperturæ convolutus; apertura irregulariter rotunde ovata, pallide fuscescens; peristoma tenue, margine infra apicem incrassato.

“Diam. maj. 11 millim., min. 8, alt.  $5\frac{1}{2}$ ; apertura  $8\frac{1}{2}$  longa, 7 lata.

“*Hab.*—Bay of Bengal, 90-102 fathoms.

“The chief characteristic of this species is the absence of radiating sculpture, a feature common to most species of the genus *Capulus*.”—E. A. S.

To this description it only remains to add that the larger and well-grown examples dredged by Mr. Townsend exhibit in nearly every case longitudinal cinnamon or pale rufous rays, thus ornamenting the shining white surface, which is hardly ever covered with any, even slight, vestiges of the very fugitive pale-brown epidermis. And, as before mentioned, the shelly basal plate has been, for the first time, detected.

Additional localities for this species are as follows:—Persian Gulf; Gulf of Oman; lat.  $24^{\circ} 6' N.$ , long.  $57^{\circ} 30' E.$ , 206 fathoms, on *Gorgonia*, *Rostellaria*, and *Conus planiliratus*, Sowb.; lat.  $25^{\circ} 54' N.$ , long.  $60^{\circ} 20' E.$ , 60 fathoms, on *Conus* mostly; lat.  $24^{\circ} 58' N.$ , long.  $56^{\circ} 54' E.$ , 156 fathoms, dead, and small, colourless, in shell-sand; also lat.  $24^{\circ} 75' N.$ , long.  $56^{\circ} 75' E.$ , 122 fathoms, on spines of *Echini*.

2. *AMALTHEA BENTHOPHILA*, Dall.

*Amalthea benthophila*, Dall, Bull. Mus. Comp. Zool. Harvard Coll., vol. xviii, No. xxix, pt. 2, p. 289, pl. xiv, figs. 1a-b.

*Hab.*—India occidentalis. “Off Sand Key, 50 fathoms. St. Kitts, 245 fathoms. Near Nevis, 373 fathoms. Guadeloupe, 175 fathoms, on spines of *Echini*. Martinique, 170 fathoms, also on *Echinus* spines. St. Vincent, 146 fathoms, on shells. Bottom temperatures  $45^{\circ}$  to  $55^{\circ} F.$ ”

The following is Dr. Dall's description:—

“Shell stout, white, smooth, with a smooth straw-coloured epidermis, and a coil of about two whorls. Apex elevated, nucleus glassy, rather large, of about one whorl; surface smooth, often polished, showing only irregularities due to growth, and a few microscopic spiral scratches, aperture subcircular, interior white, glossy, basal plate sometimes quite thin, as when the mollusc is seated on a flat stone, or on another *Amalthea*, or quite thick, as when it rests on a *Cidaris* spine. It is marked with two diverging impressions, corresponding to the position of the adductors. Lat. aperture 8.0, long. ditto 8.0, alt. 6.0 mm.

“This species, by its smooth surface, is easily distinguished from any other. The irregularities of the *Echinus* spines are not reproduced

on the surface of the shell, as its pedestal, secreted by the foot, covers all such irregularities. I cannot help doubting if there is any such connection between the base and the adductors as exists between the latter and the shell. The irregularities of the specimens living on a smooth surface indicate that they are not absolutely fixed to one spot, at least not more than *Gadinia* or *Crepidula* when young. If the adductors were organically attached to the base it would be death to the animal to move."

I think it has been well worth while giving the above descriptive remarks *in extenso* for the sake of comparison, if for no other cause. Most probably these two species are descended from a common ancestor, there being so many close points of similitude; but, while so nearly allied to each other, they are abundantly distinct from the typical section of the genus.

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